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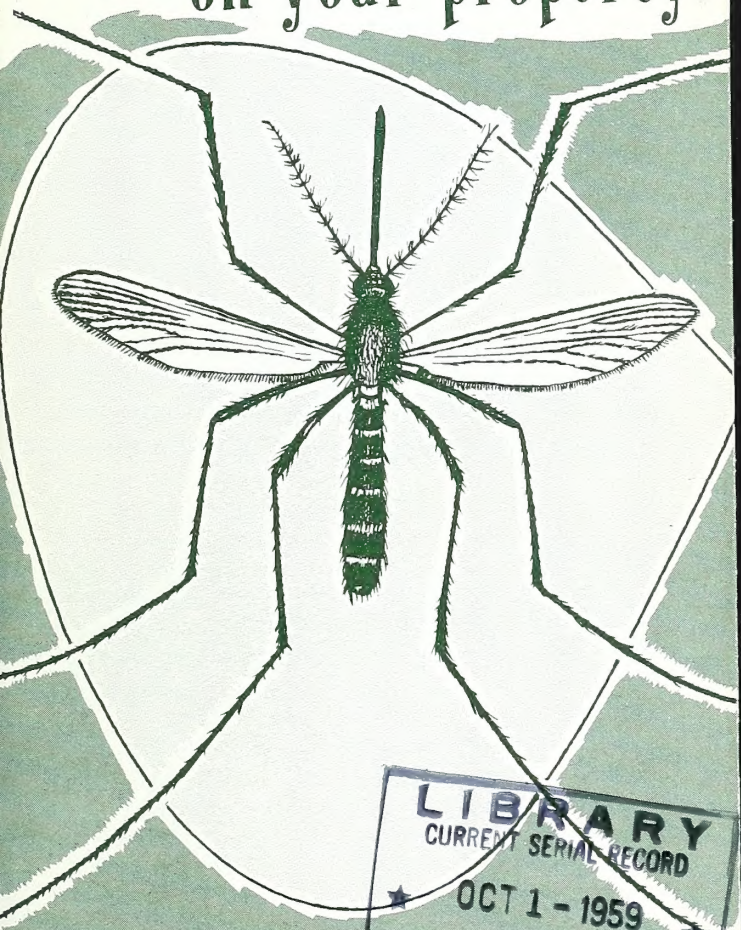
MOSQUITOES

how to control them on your property.



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LEAFLET NO. 38[illegible]
U. S. Department of Agriculture

This leaflet tells you how to control mosquitoes in and about your property.

The results you obtain may be only temporary if mosquitoes are breeding on adjacent properties or in nearby fields, damp woodlands, marshes, and irrigated pastures. A reinfestation may occur in a few hours or a few days. In such situations, effective control can be obtained through an organized community program under the direction of a responsible supervisor. If there is a mosquito-control program in your community, get in touch with the supervisor, who will assist you with your mosquito problem.

- Mosquitoes can be a severe problem on the farm. They often cause livestock to lose weight by driving them from lush pastures to barren hillsides. They may cause poultry to lose weight and to lay fewer eggs. Mosquito annoyance to farmworkers may result in lowered efficiency.

- Certain species of mosquitoes carry such diseases as encephalitis, malaria, and yellow fever.

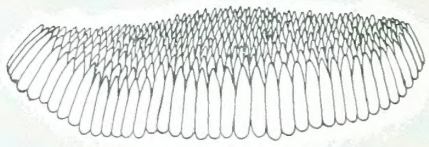
- Only female mosquitoes bite; they jab their beaks through the skin and suck blood. The males feed on flower nectar and plant juices.

This homeowner is spraying the undersurfaces of leaves with DDT. It will kill mosquitoes that rest or hide there.

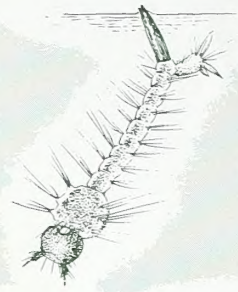
Mosquitoes often breed in tree holes. During heavy outbreaks, these places should be sprayed very often.

A good way to reduce an infestation is to spray low, swampy areas (above) with a DDT emulsion or oil solution.

An aerosol bomb controls mosquitoes indoors. Release of the aerosol for a few seconds gives good results.



Eggs.



Larva, or wiggler.

When mosquitoes become abundant in and about the home, the questions most often asked are: Where do they come from? What can we do about them?

Mosquitoes usually breed in standing water—dirty or clean, salt or fresh. The eggs cannot hatch unless they are laid on water or on places that later become flooded; the larvae (wigglers) cannot develop unless they have water to live in.

More than 100 kinds of mosquitoes occur in the United States. The most troublesome kinds come from the following habitats: Temporary rain pools, flooded areas, irrigated pastures, salt marshes, and places around the home where water collects such as tin cans, rain gutters, and ponds.[1]

If mosquitoes are a problem where you live, the first thing to do is to find and eliminate their breeding places. Additional control measures consist in killing the larvae and adults with an insecticide.

A repellent applied to the skin or clothing protects you from mosquito bites for several hours.

ELIMINATE BREEDING PLACES

Look for standing water on your property and eliminate it wherever possible.

- Remove all temporary water containers.
- Flatten or dispose of tin cans.
- Place discarded bicycle and automobile tires in places where water cannot get into them.
- Fill in tree holes with concrete.
- See that cesspools, septic tanks, rain barrels, and tubs in which water is stored are tightly covered.
- Empty and thoroughly wash birdbaths and pans for watering chicks at least once a week.
- Clean out rain gutters.
- Examine flat roofs after rains; be sure no water remains on them.
- Drain or fill in stagnant pools and swampy places. If pools cannot be drained or filled in, remove debris and floating vegetation.

[1] Following are the scientific names of some of the kinds that breed in these habitats: Temporary rain pools: *Aedes atlanticus, A. vexans, A. infirmatus, A. canadensis, Psorophora confinnis.* Flooded areas: *A. sticticus, A. vexans, A. dorsalis.* Irrigated pastures: *A. nigromaculis, A. dorsalis, Culex tarsalis.* Salt marshes: *A. sollicitans, A. taeniorhynchus, A. squamiger.* Standing water around homes: *A. aegypti, C. quinquefasciatus, C. pipiens.*

KILL THE LARVAE

If you have standing water on your property that cannot be eliminated, find out whether it contains wigglers. Dip out some water with a can or cup. Examine it carefully. If it contains wigglers, apply one of the following insecticide sprays to the entire water surface at the rate indicated:

- 1-percent emulsion or oil solution of DDT, chlordane, toxaphene, TDE, or methoxychlor, or 2-percent emulsion or oil solution of malathion; 1 ounce per 100 square feet, or about 10 quarts per acre of water surface.
- 0.5-percent emulsion or oil solution of gamma isomer of BHC (lindane), dieldrin, or heptachlor; about 10 quarts per acre.

The table (right) tells you how to prepare sprays.

Use a small power sprayer to treat large areas of water surface; use a compressed-air sprayer, or a knapsack, garden, or hand sprayer to treat small areas. Adjust the nozzle for a fine mist spray. Repeat treatment as needed, or at weekly intervals.

Sometimes it may be easier to dust the water surface. Obtain a ready-mixed 5- or 10-percent DDT dust, and apply it at the rate of 2 to 5 pounds of the mixed dust per acre of water surface.

You can also kill larvae by spreading kerosene, fuel oil, or diesel oil on the water. If there is no vegetation, apply at the rate of 2 to 4 ounces of oil per 100 square feet of water surface, or 7 to 14 gallons per acre. If the area is partially vegetated, apply oil at the rate of about 9 ounces per 100 square feet of water surface, or 30 gallons per acre. Oil is usually not effective on heavily vegetated areas; on these, use insecticide sprays.

The control of larvae in fishponds, ornamental pools, and low, swampy places requires special attention. Following are recommendations for treating such places.

Fishponds and ornamental pools.—To kill mosquito larvae without poisoning fish and plants, spray a very light mist of a pyrethrum oil solution. Pyrethrum is available ready for use from insecticide dealers. *Note:* Do not apply more than 1 ounce of spray per 100 square feet of water surface.

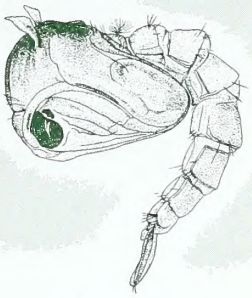
Low, swampy areas.—Mosquitoes often lay eggs in low, swampy areas and on moist soil or duff. If these areas are flooded with rain or snow water, the eggs hatch.

Spray such areas with a 5-percent DDT emulsion or oil solution before they become flooded. Apply it at the rate of 2 to 5 gallons per acre. Repeat treatment in the late fall and early spring.

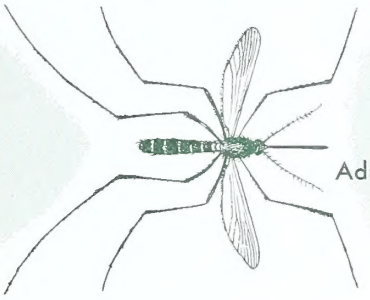
KILL THE ADULTS

Destroying mosquito larvae reduces the number of mosquitoes about your property, but it may not solve your entire problem. You may be attacked by mosquitoes from breeding places on neighboring property or from marsh areas, irrigated pastures, ricefields, or irrigation canals some distance away.

If mosquitoes fly in from such places, you can gain temporary relief by killing them with insecticide sprays.



Pupa.



Adult.

Insecticide Sprays for Mosquito Control

SPRAY	PURPOSE: TO KILL LARVAE	PURPOSE: TO KILL ADULTS: Space spray	PURPOSE: TO KILL ADULTS: Residual spray	PREPARATION
EMULSION				
0.5-percent—				
Gamma isomer of BHC (lindane).	X			Mix 1 part of 20-percent emulsifiable concentrate with 39 parts of water.*
Heptachlor	X			
Dieldrin	X			
1-percent—				
DDT	X			Mix 1 part of 25-percent emulsifiable concentrate with 24 parts of water.*
Chlordane	X			
Toxaphene	X			
TDE	X			
Methoxychlor.	X			
Lindane		X	X	
Heptachlor		X		
2-percent—				
Chlordane		X	X	Mix 1 part of 25-percent emulsifiable concentrate with 12 parts of water.*
Malathion	X	X		Mix 1 part of 50-percent emulsifiable concentrate with 24 parts of water.*
5-percent—				
DDT		X	X	Mix 1 part of 25-percent emulsifiable concentrate with 4 parts of water.*
SUSPENSION				
1-percent—				
Lindane			X	Mix 1 pound of 25-percent wettable powder with 2½ gallons of water.
2.5-percent—				
DDT			X	Mix 1 pound of 50-percent wettable powder with 2½ gallons of water.
Chlordane			X	

*To prepare an oil solution substitute fuel oil, diesel oil, or kerosene for water. Some oil solutions are available ready for use from insecticide dealers.

Note: If you use a product containing a lower or higher percentage of insecticide, use proportionately more or less of it.

Outdoors

Residual sprays.—Few mosquitoes will live to enter your home if you apply an emulsion or oil solution of one of the following insecticides to places where mosquitoes rest or hide about the home: 5-percent DDT, 2-percent chlordane, or 1-percent lindane.

These sprays are potent a week or more after they are applied to surfaces. When used in this way, they are known as residual or surface sprays. As long as they remain on the surfaces, they kill mosquitoes that come in contact with them.

Apply residual sprays to the foundations and underparts of buildings, around buildings, between logs, on tree trunks, and to the undersurfaces of leaves to a point where runoff occurs. Use a small power sprayer to treat large areas; use a compressed-air sprayer, or a knapsack, garden, or hand sprayer to treat small areas. Adjust the nozzle for a coarse spray.

Do not spray an emulsion or oil solution on vegetation; it may burn the leaves. Instead, use one of the suspensions listed in the table above.

Space Sprays.—There are times when you will want quick relief from mosquito attacks, especially during picnics, lawn parties, or other outdoor gatherings. You can control mosquitoes in these places by using one of the following sprays: a 1-percent lindane or 2-percent malathion emulsion or oil solution; pyrethrum or allethrin, which is available ready for use from insecticide dealers; or a 1-pound DDT-pyrethrum aerosol. A spray containing 5 percent of DDT may also be used. But during periods of mosquito migration near dusk, pyrethrum or allethrin is more effective.

These sprays, which are used for temporary control, are known as space or contact sprays.

Apply a space spray with a hand or power sprayer (or aerosol bomb). Aim the spray so that it will drift through the bushes, grass, and other vegetation. Repeat treatment every few hours, or as often as necessary.

Indoors

When you find mosquitoes inside your home, you can kill them with any good household spray.

An aerosol bomb is highly effective and convenient to use. Release of the aerosol for a few seconds kills mosquitoes in an average-size room. For best results, close windows and doors during spraying and keep them closed 5 to 10 minutes afterwards.

Sometimes it is necessary to apply a residual spray to mosquito resting places in the home. Apply a 5-percent DDT spray (an emulsion or oil solution) to dark and secluded spots—under chairs, tables, beds, and bookcases, in closets, behind pictures, and between furniture. The insecticide should remain effective several weeks to several months.

REPELLENTS

Repellents such as diethyltoluamide, ethyl hexanediol, dimethyl, phthalate, or dimethyl carbate give several hours of protection from mosquito bites when spread on exposed parts of the body and sprayed on clothing. The repellents are sold as single compounds and in various combinations and formulations, under different trade names.

PRECAUTIONS

Most insecticides are poisonous. Handle insecticides with care. Do not use them in concentrations greater than those recommended. If you spill an insecticide on your skin, wash immediately with soap and water. Launder clothes that become contaminated. Do not contaminate foods, dishes, or utensils. Store insecticides in plainly marked containers out of reach of children and animals.

Mosquito Control in Outdoor Recreation and Amusement Areas

Mosquitoes sometimes cut into businessmen's profits. They reduce attendance at outdoor theaters, camps, swimming pools, and amusement parks, at the time of year when these facilities are in greatest demand.

Mosquito annoyance can be considerably lessened, if control efforts are directed primarily against adults.

Insecticide mists or fogs are very effective in controlling adults. The dispersing of an allethrin or pyrethrum spray or a lindane or malathion spray or fog in the area to be protected will provide quick relief when needed. A wide assortment of light power sprayers and fog units, available at moderate prices, are well suited for treating areas of 5 to 100 acres.

In small areas—1 to 10 acres—adults can also be controlled by applying a residual spray to the ground litter, where mosquitoes hide, and to vegetation with hand sprayers or light power sprayers. Spraying is especially effective in reducing mosquito annoyance during the day.

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Other publications on household insects available from the U. S. Department of Agriculture

ANTS IN THE HOME AND GARDEN—HOW TO CONTROL THEM, Home and Garden Bulletin No. 28.
BED BUGS—HOW TO CONTROL THEM, Leaflet No. 337.
CLOTHES MOTHS AND CARPET BEETLES—HOW TO COMBAT THEM, Home and Garden Bulletin No. 24.
COCKROACHES—HOW TO CONTROL THEM, Leaflet No. 430.
THE HOUSEFLY—HOW TO CONTROL IT, Leaflet No. 390.
FLEAS—HOW TO CONTROL THEM, Leaflet No. 392.
SILVERFISH, AND FIRE BRATS, Leaflet No. 412.
WASPS—HOW TO CONTROL THEM, Leaflet No. 365.

"The Mosquito—Public Enemy," a motion picture, is available. For information on it, see your county agent.

Prepared by

ENTOMOLOGY RESEARCH DIVISION
AGRICULTURAL RESEARCH SERVICE

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